

# A Risk Management Approach for Nigeria Manufacturing Industries

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**Abstract**—To be successful in today's competitive global environment, manufacturing industry must be able to respond quickly to changes in technology. These changes in technology introduce new risks and hazards. The management of risk/hazard in a manufacturing process recommends method through which the success rate of an organization can be increased. Thus, there is a continual need for manufacturing industries to invest significant amount of resources in risk management, which in turn optimizes the production output and profitability of any manufacturing industry (if implemented properly). To help improve the existing risk prevention and mitigation practices in Small and Medium Enterprise (SME) in Nigeria Manufacturing Industries (NMI), the researcher embarks on this research to develop a systematic Risk Management process.

**Keywords**—Manufacturing industries, production output, risk, risk management, SMEs.

## I. RECOMMENDED STRATEGIES

THE purpose of this study existed as two folds: firstly to emphasize on the challenging issues behind an inefficient RM in order to create a strong safety system for SMEs in NMI. Then, to create a novel kind of support structure toward facilitating management's tasks in their decision making process with regards to risk management in NMI. This paper would focus on the first part of the researchers' study.

## II. INTRODUCTION

As noted [4]-[6], there has been tendency for the methodology of risk management, to be exaggeratedly prescriptive and mechanistic. In addition, there has been undue emphasis on the techniques of the process rather than concentrating on the most vital areas of the overall process, which are risk identification, risk assessment, and implementation of control technics [10].

Risk identification and risk assessments are designed to prevent, control, reduce (mitigate) or eliminate occupational hazards (risk) in a process (manufacturing, healthcare, supply chain etc.) and they are applied continuously over the years to keep pace with technological and economic changes [12]. Yet, despite continuous improvements, work-related accidents are still too frequent, and their costs in terms of production outcome, production downtime, human suffering, death and losses in profitability continue to be significant [1]. In many instances, the root cause of these work-related accidents can be traced not just to flaws in the risk identification and risk

assessment employed by organisations [1] but also to the implementation strategy used [5]. These errors in risk management approach have undermined safety in NMI [13], and concerns for safety system are growing rapidly [7].

Not just in NMI, industrial safety is of great concerns [26], also in many countries across the world; despite the large numbers of national and international safety monitoring and enforcement agencies, hazardous conditions are still prevalent in manufacturing industries [1].

Industrial accidents are a recurring problem of manufacturing industries in Nigeria [27]. Regulatory agencies are weighed down with the task of ensuring that industry conforms to Government safety programme standards. Yearly, cases of industrial safety system failure and accidents are reported without any sign of cessation. Improper monitoring, assessment, enforcement, and management of risk often cause accidents which usually lead to the loss of lives and properties [2].

## III. LITERATURE REVIEW

In spite of high rate of accidents and death in NMI, the general consensus in both academia and industry is that risk management is merely theoretical and a repetitive preventive assessment system and subsequence, lack enforcement in NMI. A review of the literature reveals a small number of research works investigating the impact of lack of implementation of risk assessment decision in NMI.

Risk had always been in existence from the inception of manufacturing procedures [3]. It has been defined by risk analysis and managed by professionals [21]. Risk is present in everyday activities, and decisions are made daily without deliberately attributing either quantitative or qualitative values to the risks involved; bearing in mind that it is the probability that a hazard will turn into a disaster [5]. In other words, risk is the possibility of incurring misfortune or loss [7]. Risk is innate in every aspect of human life [7] including government ventures, manufacturing industries or commercial organisations.

Risk had always been symbolised (1) as the combination of consequences (severity) of an event and the associated likelihood of occurrence [4].

$$R = \alpha\beta \quad (1)$$

where; R is Risk,  $\alpha$  is Risk probability, (Likelihood of Event),  $\beta$  is Risk consequence, (Severity of Outcome).

Reference [21] definition of risk would be adopted for the purpose of this research. Reference [21] defined risk as the

presence of a threat/hazard in a manufacturing activity that might cause the process not to achieve its corporate objectives [21]. Thus, whatever interruption (incidents, near misses or accidents) that makes an organisation not to attain its set targets is termed as risk. RM is essential in the actualisation of company objectives. Hence, in positioning RM in a manufacturing process, decisions need to be more accurately informed. In lieu of this, RM techniques are applied. However, understanding the status quo of RM in NMI in relation to accident rates (death rate, accident underlying factors), government legislations and enforcement is vital in developing an effective practice for improving its problematic state in NMI.

#### A. The Importance of SMEs to Nigeria Economy

SMEs as defined by the Nigerian National Council of Industries (NNCI) are business enterprises whose total cost excluding land is not more than two million naira (₦6,000) only [29]. The Federal Ministry of Commerce and Industry defines SMEs as companies with a total investment (excluding cost of land but including capital) of up to ₦750, 000 (₦2,500) and paid employment of up to fifty persons.

According to a recent survey and findings by research conducted on SMEs in Africa, it was confirmed that on average, there are more SME closures than expansions [22]. Most SMEs in Nigeria go into extinction within their first five years of existence, a smaller percentage between 5-10% survive, thrive and grow to maturity [29]. Most researchers [22], [25], [29] outlined the challenges SMEs encounters in the phase of survival; ironically, most studies did not recognize the uncontrolled risk as a major factor with negative impact on SMEs in manufacturing industries [17].

#### B. The Cost of Uncontrolled Risk in SMEs' Manufacturing Industries

The focus on manufacturing industries is explained by the continuous occurrence of high incidence of fatalities, major injuries and near misses in this sector. Despite these accidents, company directors find it difficult in funding risk management system and complying with legislations [28]. The perception behind this – is the belief that RM is waste of resources and it also prevent optimization of production output and profit.

As reported by Health and Safety Executives [14]-[16], around 270 million people in the world fall victim to occupational injuries, fatal and non-fatal accidents every year. Recent Health and Safety Executive figures show that data from the Labour Force Survey (LFS) indicates that in 2011/12 that approximately 30 million days (1.24 day per worker) were lost overall as a result of injuries and ill health during 2008/2009; 25 million were due to work related ill health and 5 million due to workplace injury [9]. The cost of this, on employer(s), business organizations and the society as a whole is huge [9], [7].

#### C. The State of RM in Nigeria

There is unanimity that RM is poor in an emerging economy [12], [27], [30]. This is on the basis that industrial accidents are being less reported than in reality. The occupational Health and Safety (OHS) regulatory and enforcement systems in developing countries (which are intervention strategies) are weak and dysfunctional [20]; industrial mishaps and disasters are still on the high [10]. As a result, developing an effective systematic approach to improve RM in developing countries is challenging [23]. This explains why researchers reported an alarming increase in industrial accidents in developing countries.

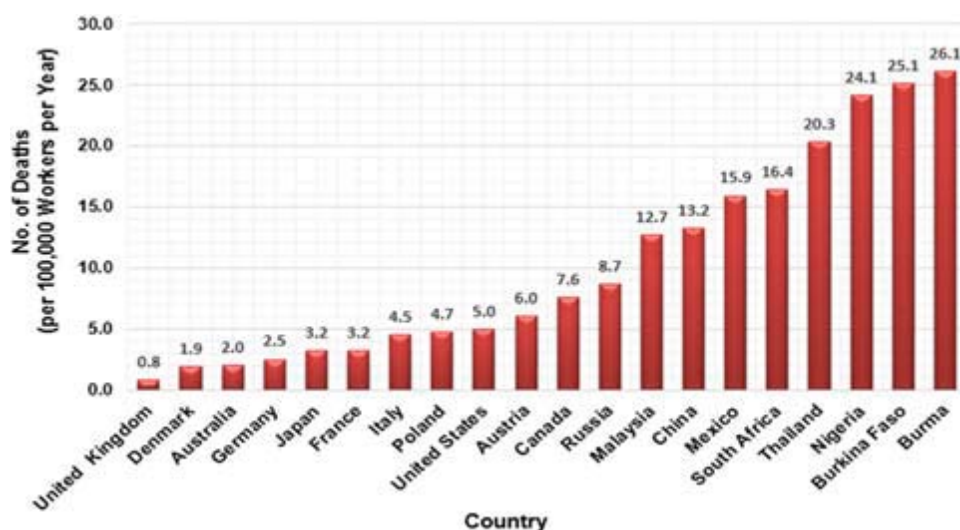


Fig. 1 Work-related fatality rate for 20 countries in 2007, extracted data [12]

In Nigeria, research of the nature and extent of industrial accident and death rate (1987 to 1996) of Nigerian factories 2001 [10], indicates that 3138 injuries reported of which 71 (2.26%) were fatal; the highest annual case fatality rate of

5.41% in 1994 and a lowest rate of 0.94% in 1990 (Table I). Similarly, 12 years on; research for a period of 11 years (2002-2012) still shows a massive under-reporting of industrial accidents despite the economic gains in Nigeria

industrial sector [30]. Reference [30] indicated that a total of 93 injuries reported of which 46 (49.5%) were fatal (Table II). These records are astonishing [18], even if compared to other countries. Yet, this is not a true picture of what is obtainable in NMI [10] because the records are worse than specified above, as a poor RM regulatory system in Nigeria does not encourage mandatory reporting of accidents [18], which Nigeria 'Factory Acts' requires. For instance, as reported by Nigeria Red Cross and national newspapers; on the night of 15<sup>th</sup> September 2002, a fire outbreak claimed 45 lives in a Nigeria plastics industry in Lagos state [19]. On the contrary, Federal Ministry of Labour and Productivity: Factory Inspectorate Department (FMLP:FID) (Annual Industrial Accident report) recorded one incident and the number of deaths was documented as 29 (Table II) for the same year. This simple conflict in accurate records of data justifies the assumption that states,

*"...Federal Ministry of Productivity and Labour: Factory Inspectorate Department (FMLP:FID) annual accident report is not a true representation of what is obtained in Nigeria factories, the records are worse than stated, as the poor OSH regulatory system does not encourage mandatory accidents reporting which is required by the regulations. The enforcement of OSH policy is porous likewise..."* [10], [18].

TABLE I  
 ANNUAL DISTRIBUTION OF INJURIES AND DEATHS (1987-1996)

Year	No. of injured workers	No. of deaths	Case fatality rate
1987	478	16	3.35
1988	462	8	1.73
1989	333	4	1.20
1990	319	3	0.94
1991	420	4	0.95
1992	366	4	1.09
1993	295	7	2.37
1994	222	12	5.41
1995	170	8	4.71
1996	118	4	3.39
Total	3138	71	2.26

Table structure and content adopted from [10] accident report collected from FMLPID (1987-1996). No records given from 1997-2001 by researchers.

TABLE II  
 ANNUAL DISTRIBUTION OF INJURIES AND DEATHS (2002-2012)

Year	No. of injured worker	% of injured worker	No. of deaths	% of deaths	No. of accidents reported	Case fatality rate
2002	50	53.8	29	63	1	58
2003	1	1.1	1	2.2	1	100
2004	-	-	-	-	1	-
2007	4	4.3	1	2.2	3	25
2008	8	8.6	6	13	2	75
2009	3	3.2	2	4.3	16	66.7
2010	5	5.4	1	2.2	3	20
2011	8	8.6	2	4.3	7	25
2012	14	15.1	4	8.7	6	28.6
Total	93	100	46	100	40	49.5

Table structure adopted from [10] and content from accident report collected from FMLPID (2002-2012) [30]. No records given for 2005 & 2006 by the researcher.

The statement above validates that in Nigeria employers take advantage of the loopholes in the enforcement of Factory Acts. This makes industrial accidents under-managed; with fatality and accident rates increasing; management commitment to accident prevention and mitigation remains poor. This is demonstrated by studies by researchers that reveal the weak and non-functional state of OHS regulatory system in NMI [10], [18], [19], [26].

It is vital to examine the noticeable causes of the poor level of RM enforcement in NMI, so as to improve occupational safety; shockingly, researchers have overlooked this area. Against these backdrops, this research examines the challenges of RM best practices in NMI.

#### D. The Challenges of FMLP:FID

At present, RM in Nigeria is largely based on the Factories Act (1958, 1987 & CAP.126 L.F.N.1990, CAP. F1 L.F.N.2004) [11] which seems to be largely insufficient in terms of coverage, empowerment, independence and auctorant. Reference [17], [27], [30] pointed out that the very few complementary RM related regulations in Nigeria judiciary are distributed across various legal documents. In principle, Factory Inspectorate Division of Ministry of Labour and Productivity (FMLP: FID) is conferred with the responsibility of safety management, which so far has not been effective [9]. The requirement for manufacturing industries to report RM related incidents is stipulated in the Factories Acts (1958, 1987 & 1990). However, enforcement has been poor [25]. This failure has been attributed to some structural deficiencies associated with the Factories law. For instance, manufacturing industries who fail to report specified accidents are liable to a fine no more than N1000 (Factories Act (1990), Section 51(4)) which is equivalent to about \$3.30 (assuming U.S \$1.0 = NG N302 [8]). A significant goal of sanctions, which include correction and deterrence, is defeated [1].

Thirty-four years on, after signing the Geneva Convention in 1981, implementation of the proceedings of the convention is still inconsequential [25]. Researchers maintain that RM in Nigeria is still under-practice and poor [17]-[19], [24]-[27], [29], [30]. In view of this emphasized statement, it is appropriate to further study the key issues to the under-practicing status of RM in Nigeria. As argued in previous sections by researchers, it is apparent that skilled professionals and enforcement are major factors to effective practice of RM in NMI. Reference [27] supported this view; it identified insufficient institutional safety programme among challenges of effecting food regulation and enforcement in Nigeria. References [1], [10] in like manners earlier stated that insufficient number of competent factory inspectors hinder the enforcement of RM regulations in Nigeria. However, as recommended [21], a self-regulatory style of enforcement would help to improve enforcement and also, he suggested that adequate training can improve competence of safety professionals, hence an optimum enforcement achieved. Nevertheless, adequate trained personnel are vital for enforcement improvement. Further in-depth research indicates

political influence [19], corruption, bribery [30], inadequate funding, inadequate legislation [17], lack of government commitment, inadequate information [10], culture [25], economic growth and technology advance are listed as an issue in improving the practice of RM in Nigeria.

#### IV. CONCLUSION

The rapid spread of government legislation, guidelines, and policies in the area of RM have forced many organizations, especially manufacturing industries, to spend large amounts of time and effort certifying that they comply with all that is required of them. Compliance with government legislation can easily give rise to self-satisfaction, the feeling that if the organization has complied with all demands made upon it, usually through the use by specialized professionals or sophisticated modeling techniques, then it is safe from risk. However, much of the risk that organizations face does not lend itself to being managed in this way. The aim of most risk management systems might well be accuracy – accuracy in identifying, prioritizing, and then managing risks. But in an uncertain production environment, and for the types of risk that do not allow the building up of databases, accuracy of risk and loss predictions is likely to be very weak. Hence, risk management in manufacturing industries cannot be a one-off stand-alone task that can be managed by top management and implemented by a few specialists. Many risks, such as operational risks, are unpredictable and can arise any time anywhere in the organization, and this means that all personnel must be aware and committed. Only if all key people are involved and committed to risk management, they will be aware of the possible importance of any weak danger signals that they might encounter.

#### V. EXPECTED RESEARCH CONTRIBUTIONS

This study is expected to contribute positively to the practices of RM in SMEs in developing countries by making RM process more practitioner-oriented, providing clear guidelines to all stakeholders (government, safety agencies, manufacturing practitioners and academicians) in manufacturing industries.

#### REFERENCES

- [1] Adebisi, K. A., Charles-Owaba, O. E. Towards setting a sustainable manufacturing safety programme in Nigeria 2009
- [2] Alexander, C. Risk management and analysis, Volume 2: New market and Procedures, Wiley, New York, NY 1999.
- [3] Billington R. and Allen R, Reliability evaluation of engineering systems – concepts and techniques. Pitman publishing, London 1983
- [4] British Standard, BS ISO 31000, Risk management- Principles and guidelines. Standards Policy and Strategy Committee, UK, 2009
- [5] Chapman, Robert J. The controlling influences on effective risk identification and assessment for construction design management 2001
- [6] Dale B., Williams R., Bertsch B., Wiele T., Iwaarden J., Smith M., and Visser R., Quality and risk management: what are the key issues?. In The TQM magazine, Vol. 18 No. 1, pp 67 – 86, Emerald Group Publishing Limited 2006.
- [7] Davies, J., Ross, A., & Wallace, B. Safety management: a qualitative systems approach. CRC Press. 2003.
- [8] D'Exchange Rate: Exchange rate checked at www.abokifx.com accessed at 26th January 2016

- [9] Elena Beauchamp-Akatova, Richard Curran. From initial risk assessments to system risk management 2013
- [10] Ezenwa, O.A., A study of fatal injuries in Nigerian factories. Occupational Medicine. 51(8), 485-489. 2001.
- [11] FRN, (1990). Federal Republic of Nigeria. Factories Act (1987). Available at: <http://www.ilo.org/dyn/natlex/docs/WEBTEXT/47979/65089/E87NGA01.htm>. Accessed Jan, 2014.
- [12] Hamalainen P, Saarela KL, Takala J. Global trend according to estimated number of occupational accidents and fatal work-related diseases at region and country level. J Saf Res; 40(2): 125-139. 2009.
- [13] Haimes, Yacov Y. Risk modeling, assessment, and management 2005
- [14] Health and Safety Executive (HSE). A Guide to Health and Safety Regulation in Great Britain (2013). Available at: <http://www.hse.gov.uk/pubns/hse49.pdf>. Accessed June, 2015.
- [15] HSE (homepage of Health and Safety Executive) (online) <http://www.hse.gov.uk/search/results.htm?q=what+is+danger&site=jano68&cof=FORID%3A11#964> accessed on 21st Feb 2015
- [16] HSE UK. Available at: <http://www.hse.gov.uk>. Accessed December, 2015.
- [17] Idoro, G. I., Comparing Occupational Health and Safety (OHS) management efforts and performance of Nigeria construction contractors. Journal for Construction in Developing Countries. Vol. 16 (2), pp 151-173. 2011.
- [18] Idoro, G. I., (2008). Health and Safety Management Efforts as Correlates of Performance in the Nigerian Construction Industry'. Journal of Civil Engineering and Management. Vol. 14 (4), pp 277-285.
- [19] Idubor, E. & Oisamoje, M., An exploration of health and safety management issues in Nigeria's efforts to INDUSTRIALIZE. European Scientific Journal April 2013 edition vol.9, No.12 ISSN: 1857 – 7881 (Print) e - ISSN 1857- 7431. 2013
- [20] Jones, E., The failure of risk management: How to fix it. John Wiley & Sons, Inc., Hoboken, New Jersey. 1998.
- [21] Kumar M. Risk management practices in global manufacturing investment. University of Cambridge. 2010
- [22] Liedholm C., The Dynamics of Micro and Small Enterprises in Developing Countries. World Dev., 26(1): 61-74. 2013.
- [23] Mursu, Anja., Information systems development in developing countries: Risk management and sustainability analysis in Nigerian software companies 2002
- [24] Odero, W. Road traffic accidents in Kenya: An epidemiological appraisal. East African medical Journal 72 (5), 299-305. 1995
- [25] Okafor, C. Motivational Patterns of Women Entrepreneurs in Small and Medium Scale Enterprises: A Case Study in South-West Nigeria. Ph.D Thesis in the College of Business and Social Sciences, Covenant University, Ota, Ogun State ,Nigeria. 335p. 2009
- [26] Okolie, K. C., and Okoye, P. U. Assessment of national culture and construction health and safety Climate in Nigeria. Science Journal Publication, Vol. 2012, 6 pp. 2012.
- [27] Olayinka, O. S., Abdullahi, S. A. An Overview of Industrial Employees' Exposure to Noise in Sundry Processing and Manufacturing Industries in Ilorin Metropolis, Nigeria. 2010
- [28] Smit, Pieter J., Cronje, G. d. J., Brevis, T. and Vrba, MJ. Management principles: A contemporary edition for Africa 2011
- [29] Uboma N., The Challenges of SMEs Based on Vision 20:2020. Department of Marketing, University of Nigeria. 2012.
- [30] Umeokafor, N. I., Umeadi, B., & Jones, K.G., Compliance with Occupational Health and Safety Regulations: A Review of Nigeria's Construction Industry. In Ejohwomu, O. & Oshodi, O. (eds) proceedings of the 3rd International Conference on Infrastructure Development in Africa ICDIA 2014, pp 70-84. 2014

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